Claims

1. A method for the amplification of genomic DNA whereby the cytosine methylation pattern of the genomic DNA is retained in the amplificate sequence(s), said method comprising the following steps:
(a) heating the genomic DNA to a temperature operative to cause denaturation
(b) cooling the denatured DNA in the presence of single stranded oligonucleotide primers such that the primers anneal to the DNA
(c) heating the mixture in the presence of a polymerase and nucleotides to a temperature such that the primers are extended
(d) contacting the double stranded nucleic acid with a methyltransferase and a methyl donor molecule under conditions conducive to the methylation of the synthesised strand such that the CpG dinucleotides within the synthesised strand are methylated according to the methylation status of the corresponding CpG dinucleotide on the template strand thereby preserving the genomic methylation pattern
(e) repeating steps A-D a desired number of times to reach a desired number of nucleic acids.

2. A method according to Claim 1 wherein the methyltransferase is a maintenance methyltransferase.

3. A method according to Claim 1 wherein the methyltransferase is DNA (cytosine-5) Methyltransferase (DNMT 1).

4. A method according to Claims 1 to 3 wherein the methyl donor molecule is S-adenosylmethionine.

5. A method according to Claims 1 to 4 wherein the methyl group carries a detectable label which is incorporated into the synthesised nucleic acid strand.

6. A method according to Claims 1 to 5 wherein a plurality of primer oligonucleotides are immobilised on a solid surface.

7. A method according to Claims 1 to 5 wherein the methyltransferase is immobilised on a solid surface.

8. A method according to Claims 1 to 5 wherein the polymerase is immobilised on a solid surface.

9. A method according to Claim 1 further comprising Step (f) a treatment with an agent capable of distinguishing between methylated and unmethylated cytosine bases.

10. A method according to Claim 9 wherein the agent is a methylation sensitive restriction enzyme.

11. A method according to Claim 9 wherein the agent is a bisulphite solution.

12. A device for the methylation pattern retaining amplification of nucleic acids according to Claim 1 said device comprising two or more reaction chambers, channel means providing fluid connections between adjacent chambers and the first and last reaction chambers, temperature regulating means for controlling the temperature of each reaction chamber.

13. A device for the methylation pattern retaining amplification of nucleic acids according to Claim 1 to 6 comprising

two vessels,
a reaction chamber,
temperature regulating means for controlling the temperature of the reaction chamber,
means for transferring liquid reagent form the first and second vessels to the reaction chamber,
channel means providing fluid connections between adjacent chambers and the first and last reaction chambers
means for draining liquid reagents from the reaction chamber.

14. A nucleic acid obtainable by a method according to one of the claims 1 to 11.

15. A method of manufacturing a methylated nucleic acid using a method according to one of the claims 1 to 11.